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A
T R E A T I S E
ON THE MANAGEMENT OF
PEACH AND NECTARINE
T R E E S;
EITHER IN
FORCING-HOUSES,
OR ON
HOT AND COMMON WALLS.

CONTAINING
An Effectual and Easy PROCESS for preventing them from
being infected with any Species of INSECTS they are
liable to suffer by: Also, Ample DIRECTIONS for
Constructing proper FORCING-HOUSES and
HOT-WALLS; illustrated by a PLAN.

To which is added,
A successful METHOD of Raifing and Forcing VINES.

BY
THOMAS KYLE,
GARDENER TO THE HONOURABLE BARON STEUART
OF MOREDUN.

THE SECOND EDITION, ENLARGED AND IMPROVED.

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TO THE HONOURABLE
DAVID STEUART-MONCREIFFE
of MOREDUN, Esq;

ONE OF THE BARONS OF HIS MAJESTY'S
EXCHEQUER IN SCOTLAND.

S I R,

GRATITUDE for many favours, joined to the strongest conviction that you originally suggested the hints on which these improvements in the art of Forcing are founded, were the motives that emboldened me to petition your protection for a former impression. Your condescending to patronize the performance,

A 2

infused

insured success to it; which encourages me humbly to request the honour of again prefixing your name to the following pages. I am, with the utmost respect,

S I R,

Your dutiful Servant,

THOMAS KYLE.

MOREDUN }
Jan. 1787. }

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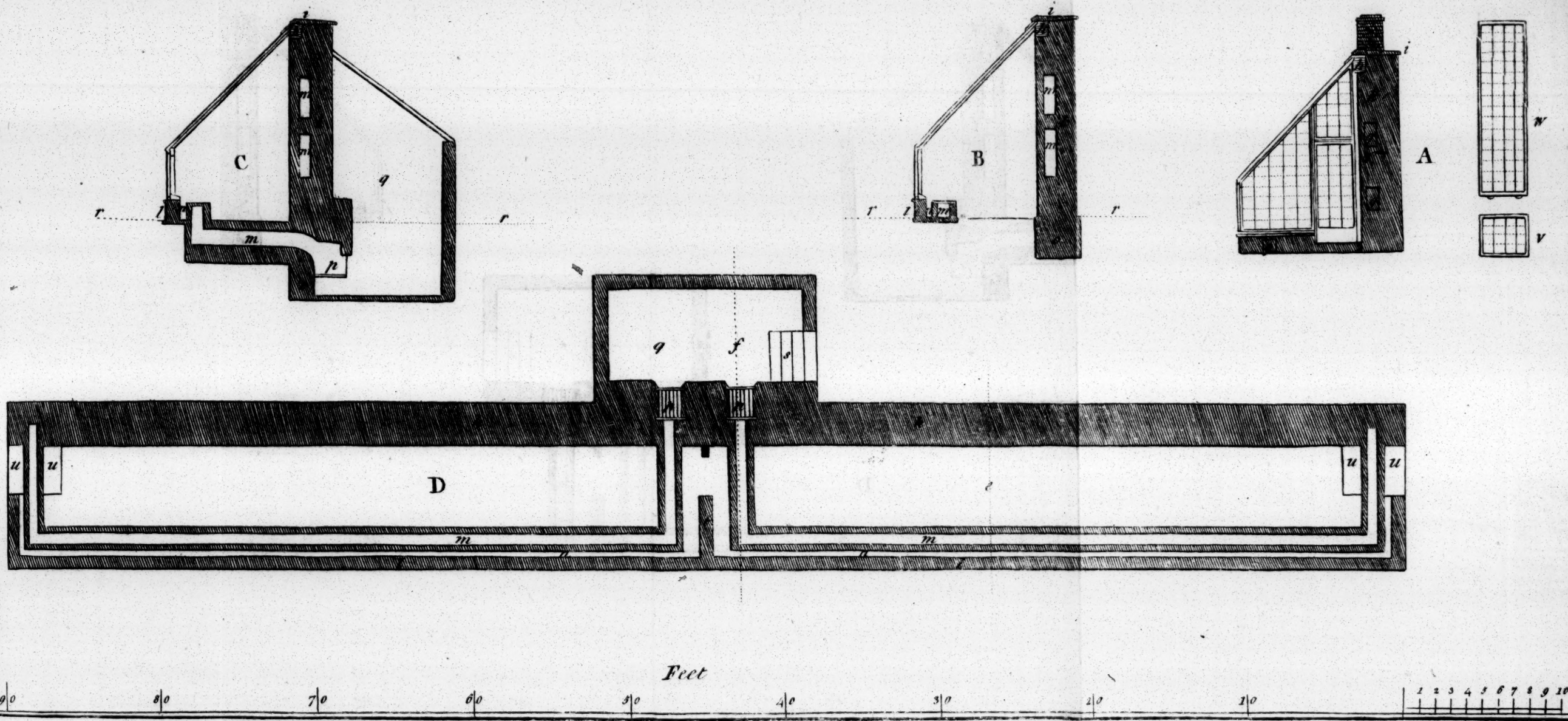
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PLAN of an approved **FORCING-HOUSE** for Fruit-Trees

A
T R E A T I S E
O N
Forcing P E A C H E S, &c.

C H A P. I.

*On the Construction of a Forcing-House,
for early Peaches, Nectarines, and Vines.*

IT having been found from experience, that the climate of Scotland is too cold, and the summers too short, for bringing Peaches and Nectarines to perfection, although the trees were planted

B

in

in the warmest soils and most favourable situations, Forcing-houses of various constructions have been built to accelerate the ripening, and heighten the flavour, of those delicious fruits. The greatest part of these forcing-houses are from twelve to sixteen feet wide; having vines planted in the front, and trained up the roof, a row of peach trees along the middle, in the espallier way, and another along the back-wall against a trellis. The impropriety of this plan must appear, when it is considered, that the vines cover the whole slope, and their shoots being often only five or six inches separate, their leaves exclude the sun and light not only from the grapes, but also from the two rows of peach and nectarine trees; which can never produce good crops of well-flavoured fruit, when they are so far
from

from the glass, and receive so little of the sun's influence. Likewise a greater degree of heat being kept up for the vines than is proper for the peaches, the shoots of the latter will be weak and drawn. Another inconvenience attending the foregoing plan is, that though a wide house-may answer tolerably well for producing late fruit, is very ill adapted for early forcing; because in cold frosty weather it is almost impossible to warm the house properly, without overheating the flues; not to mention the great expence of fuel. To remedy these defects, I would propose the following plan of a Forcing-house for Peaches and Nectarines.

IF it is intended to have these fruits ripe so early as the first of May, forty-five feet is the proper length to one fire;

B 2

and

and where there are more apartments designed than one, two furnaces should be placed together behind the middle of the back-wall of every ninety feet, three feet apart from one another, and covered with one shade. In order that the flues may have sufficient suction, the bars of the furnaces must be sunk at least one foot eight inches beneath the level of the bottom of the flues that lead from them.

THE breadth of the forcing-house should be seven feet between the front and back-walls; the latter to be eleven feet six inches high, and two feet seven inches thick, including eight inches and an half for the breadth of the flues: the former nine inches broad, and fourteen inches in height above the border inside.

THE

THE flues to be constructed in the following manner—They should be brought straight from the furnaces, across the house and below the border, to within four inches of the front-wall, when they must be raised above it, and built on the surface, leaving a space of four inches between them and said front-wall.

THESE flues should be brought into the back-wall, by crossing the border at each end of the forcing-house, and run twice along it. The first flue in the back must be three feet deep, eight inches and an half wide, and two feet and an half above the border; the second or uppermost two feet and an half deep, the same in breadth with the bottom one. Between these two flues there ought

ought to be three courses of bricks besides the covers.

THE flues along the front should not be constructed before the other parts of the building are finished, and the whole done to the flues putting on: if they are built sooner, lay boards along them to prevent the covers being broke by the carpenters when erecting the wood-work. They should be thus constructed—Where they cross the border from the furnaces, let them be so low as, when covered six inches thick, the tops of them may be no higher than the surface of the earth: without this precaution, the heat would arise too strong in that part when brisk fires are used. It is unnecessary to have the earth, on which these light buildings are placed, made more solid than by tread-

treading it once over; which done, and the surface made smooth and level, lay the bottom of these flues upon the top of the border with thin flag-stones or pavement-bricks, one foot four inches in length, which will make their foundations of a proper breadth, viz. seven inches for flue, and nine for the brick-work. They should be built with stock-bricks; if not, well shaped common ones. Four courses of them laid in bed will make the flues about eleven inches deep, which is sufficient. They must be covered with like pavement-bricks one foot four inches in length: These covers should not exceed two inches in thickness, and not be less than one inch and three fourths. Neither front nor back flues ought to be plastered.

Of late years, it has been recommended as a great improvement, to have the furnaces placed in front of all forcing-houses; which is now a good deal in practice. A peach-house thirteen feet wide, the same in height, and an hundred feet long, would require to have furnaces both in back and front, with a flue to run along the middle of it; but in one seven, or even in one nine feet broad, it is more proper to place the furnaces behind as directed; which is far more convenient, and answers the same purpose; the walk in front also being all of a-piece, will be more agreeable to the eye.

THE wood-work of this forcing-house should be thus constructed. Upon the front-wall place three feet four

2 inches

inches of upright sashes, including the top and bottom beam in front. The upright and sloping sashes to be three feet broad: the latter in one length, without ropes and pulleys; but so as one person can move them up and down with ease from the outside. The upright glasses may be fixed with three small latches within-side; but not made in the method of sliding past one another, for the purpose of giving air. In a house of the breadth recommended, viz. seven feet, or even in one, two, or three feet wider; the top is the most proper place for the admission of air.

If the house is ninety feet long, it should be divided across the middle by a sash-door and partition; that one part may be forced some time before the

C

other,

other, in order to continue the fruit longer.

THE trellis for training the trees upon must be made in the following manner. Fix a bar of wood one inch and a half thick, and three inches broad, to the back-wall, horizontally, and eight inches above the surface of the border: about five feet above this, fix a second horizontal bar to the solid building between the two flues; this ought to be two inches broad, the same in thickness with the bottom one. The beam of wood on the top of the wall into which the rafters are joined, should project over the face of it about one inch; to which beam and the two horizontal bars, their narrow sides next the wall, fix erect bars, one inch broad and half an inch thick; placing them with their
broad

broad sides next to the horizontal ones, and four inches and an half separate. This trellis is more suitable for training the trees upon, than the method commonly practised of having the small bars placed horizontally.

C H A P. II.

*On the Management of early forced Peach
and Nectarine Trees, &c.*

THE border for the trees should be made of pretty strong fresh loam, taken from rich old pasture-ground, six or seven months before it is brought into the forcing-house, that the turf may be rotten. To each cart-load of the above, add three wheel-barrowfuls of old hot-bed dung. The whole ought to be well mixed, by turning and throwing it in heaps. Eighteen or twenty inches will be a sufficient depth for the border.

IN

IN order to have a pretty good crop of peaches and nectarines the first year of forcing, plant three trees in one division of the house, that have produced fruit for a few years, and of the kinds that are known to be good; whose branches are extended five or six feet on each side of the stem, not above eight or nine years old, and free of canker or mildew: Such trees can only be removed a short distance with safety: if they are in the same garden in which they are to be forced, so much the better. They must be prepared for the house in the following manner.

ABOUT a twelvemonth before it is intended to remove them, *i. e.* in November or December, dig a semicircular trench about three feet from each of their stems; make it about two feet
broad,

broad, that there may be room to get below the roots that extend to it, and smooth the ends of them with a knife after they are cut by the spade. If the ground is not mellow and rich, with an instrument that will not hurt the roots, clear away so much of the earth as to leave four or five inches of the extremities of them, and fill the trench immediately with rich fresh mould, rather light than otherwise: then give a good watering to settle the earth among the roots, which must not be trode. This prepares the trees for removal with safety; as many small fibres will be produced from the ends of the roots that were cut, which will be of great service to the trees when planted. If they were not pruned before, do it now as follows: If they are rather luxuriant, thin the wood so, as when it is nail-

ed to the wall, the same year's shoots may be about nine inches separate: if they are middling as to strength, let them be placed about ten or eleven inches apart: shorten none of them at this time; only thin them as directed, and in such a way, that the trees may produce a regular supply of bearing wood.

IN the month of February or March following, according to the forwardness or lateness of the trees beginning to push, give them their spring pruning, by shortening the shoots. Cut always at a bold wood-bud, which is easily known by the time the petals, commonly called *flower-leaves*, begin to appear; this being the most proper season for performing such pruning of peach and nectarine trees.

FROM

FROM such of last year's shoots as are pretty strong, cut off about one third, and from weaker ones about the half of their length. From weak shoots of last year, suffer only one to be produced, and from others no more than two. Rub off all that are useless before they have time to expand their leaves. Regard must be paid to have the trees properly furnished with bearing wood, and only to suffer a few fruit to ripen on them this season. It will probably happen that they will produce fruit-bearing spurs; let them remain till the following spring pruning.

THESE trees must be often looked over, and but a very few more shoots allowed to grow than what should be left for the first year of forcing. Where two are left on one of last year's, let the
lowest

lowest be as far from the leading one as can be got pretty strong. Train the young wood to the wall in regular order as it advances.

THE middle of November is a proper time to bring the trees into the forcing-house; but before they are taken up, let the pits in it be ready for their reception. If the bottom is clay, there must be flag-stones about a yard square laid below every tree, to prevent the roots going deeper than the earth prepared for them: if they were to get lower, the trees would canker; likewise the fruit would not be so well flavoured. Whatever the bottom be, it is a good method to lay flags; or, if these cannot be procured conveniently, flates or tiles, with their edges laid over one another, will answer the same purpose; as the

D best

best flavoured fruit are produced from trees whose roots are near the surface. These flags must be placed so low, as when they are planted a proper depth, there may be six inches of earth between the roots and the stones.

Avoid taking up the trees in sunshine or wind, as the young fibres would suffer if a short time exposed thereto. In removing them, dig a semicircular trench about a foot farther from their stems than where the roots were cut at, and clear the earth away so as to get under them all : trees of the size mentioned cannot be moved with balls of earth ; but it is necessary to have them taken up with the whole of their roots as entire as possible. From those that were cut the preceding year, many small fibres will be produced ;
spread

spread these carefully in the pit when planting.

PLACE them rather shallow than otherwise, and immediately give a good watering with the rose on the pan: this will settle the earth among the roots.

LAY boards to stand on, that the ground may not be trode, and tie the trees to the trellis soon after they are planted, to prevent their being injured by the wind. The young wood, which is to produce fruit and shoots the following year, should be placed from six to eight inches separate. With regard to old naked branches, there cannot be so much regularity observed with them.

If there is a little wood to spare, as most likely there will, cut out the weak-

est shoots, and such as are only furnished with single buds, *i. e.* flower-buds, without leaf or wood ones accompanying them at the same joint; as the fruit of such are most liable to drop, and never come to maturity.

IF such trees as the three mentioned for producing fruit the first year of forcing, cannot be procured conveniently for the other apartment of the house, plant in it five young, strong, trained trees, about three or four years old from the bud, and free of mildew or canker. Plant and water them as the others: which done, cut out the weakest shoots, and tie the others to the trellis: if they are vigorous, place them about eight or nine inches separate; if middling as to strength, about ten. The second and fourth tree must be taken away when
there

there is not room to continue them longer: Before that time they will have produced fruit much above their value when planted.

WHEN the shoots are all tied to the trellis, take away the boards, and dig the border from end to end: leave it rough and open till the fashes are put on. Care must be taken not to touch the roots with the spade at this time, as it would do more hurt to the trees when new planted, than after they have been a year or two established.

IN the last week of January make the border level and smooth in both divisions. Lay a wooden walk from end to end, sixteen inches broad, one foot and an half from the back-wall, and in such lengths as can be moved conveniently,

niently, made of deals five inches broad, and one inch and a quarter thick, leaving about half an inch of an opening between them, that air and moisture may not be too much excluded from that part of the border beneath the walk: there should be two bricks laid across and below it, about five feet distant, to keep it just clear of the earth.

At same time, put the sashes on both apartments, and give air in sun-shine weather.

In the first week of February apply the fire-heat to the division that is planted with trees prepared for producing fruit the first year of forcing; and about eighteen days after, to the other.

FROM the time the forcing is begun,
till

till the fruit are about the size of pease, keep the mercury in Farenheit's thermometer about the point 55° with fire-heat. From the time that the fruit are of the size mentioned, increase it by degrees to 60° , and keep it as near to that point as can be done. With sun-heat in winter to the middle of February, keep it about 60° ; increase it gradually to 70° : in summer it ought not to exceed 80° , and but seldom should get to that height.

As nothing is more essential to the health of the trees than fresh air, due attention must be paid to this particular through the whole course of forcing. The only rule that can be given for the proper admission of air, is the state of the weather, joined to an exact observation of the thermometer, according to
the

the points directed for different seasons: For when there happens a course of cold dark weather, the house can be so warmed by the flues, as to make it practicable to admit a little air without starving the trees. In short, air should be given less or more every day, unless the weather is uncommonly cold and stormy.

THE proper time to shorten the shoots is when the petals begin to appear. Cut always at a bold wood-bud, which by this time is easily known, taking away about one third of the length of last summer's shoots in general, in the first year of forcing. If there are any that have no wood, or leading bud, but the one at the end of the shoot, such ought not to be shortened, otherwise the fruit on them would be lost; if they should remain and ripen, they would

2
have

have no flavour: but such shoots as these, if shortened, commonly die before the fruit is ripe; so when there is any wood to spare, such must be cut out.

If plenty of blossom is appearing, leave only a few of the spurs that were produced last season. If it was favourable, with a fine autumn, and the trees were brought from a warm situation, the wood will be ripened and the blossoms strong. From such trees a good crop may be expected, if they are managed according to the preceding and following directions.

FROM the strongest last year's shoots, suffer but two to be produced; from others, only one; and rub off all unnecessary wood as soon as it appears:

E observing

observing that such shoots as grow at the foot-stalks of the fruit should remain till they have got six or seven leaves; then pinch their tops, by taking off so much as to leave four or five; as they push anew, cut the young part off at the same place.

WHEN any of the shoots are too vigorous, *i. e.* the same year's wood pushing out shoots, take off those that are not properly placed for training, stop the strong leading branch, and tie two or more of the lateral ones to the trellis, according to their strength: the following year they will bear fruit; whereas the one they are produced from would have none.

PEACH and nectarine trees, whose wood
is

is not well ripened, frequently produce at their extremities, the following spring, shoots very much covered with leaves, having a small weak twig at the foot-stalk of each of them. As such spongy branches never bear fruit, they must be removed as soon as observed, by cutting down the last year's wood to the next proper shoot on it. These unfruitful growths are of a very different nature from the luxuriant shoots just mentioned, and may be easily distinguished from them: for the former produce a small slender twig at every leaf, which are very numerous; whereas the wood of the latter is of a firmer texture, without so many leaves and lateral shoots, which are likewise stronger, and push freely, especially when the main shoot is shortened as directed.

TRAIN the young wood that is to remain, in regular order to the trellis as it advances.

WHEN the fruit are about the size of horse-beans, begin to thin them where they are too thick; but let this be done sparingly at first: many come off of themselves before they arrive at that size, and part will drop while stoning, and have been about three weeks at a stop in swelling. The first season of forcing, there may be left about a dozen to the square yard on the trees. Every year after the first as follows: on vigorous trees, eighteen or twenty at most to the square yard; on trees that are middling strong, fourteen or sixteen; and on weaker ones in proportion.

BUT it is necessary to observe, that
trees

trees which have been some years forced, will produce their flowers in such abundance, as to have six or seven in a cluster: when this is the case, cut the weakest fruit, when set, through the middle with a pair of narrow-pointed scissars; the remaining part will soon decay; and by this method of thinning them, the foot-stalks of those that are left will not be wounded.

THE peach and nectarine belong to the class *Icosandria*, and the order *Monogynia*, which contains most of the eatable fruits; the flowers are hermaphrodite, with about twenty-six *stamina* or male parts, and one *pistillum* or female organ. It sometimes happens that there are two styles in one flower; then the peach or nectarine has as many stones, and looks like two grown together.

ther. I have several times observed three styles in the same flower, but have not known fruit ripened from such, and seldom from those with two.

WHEN too great a number of fruit is left on the trees, they will be small, and not so well flavoured; the trees also will not have sufficient strength for producing a good crop next season.

WHEN the peaches and nectarines are near about ripe, cut off such leaves, allowing a little of their foot-stalks to remain, as entirely exclude any of them from the sun, but no more than what is necessary for a small part of the fruit to receive the rays some time of the day: this will cause them to be more beautiful, and rather adds to their flavour:
if

if many of the leaves were taken off, it would hurt both the trees and crop.

AT fame time gather a quantity of clean mofs, which in many places is not difficult to come at, being too common, and spread it below the trees two or three inches thick, and eighteen inches broad, to prevent any of the ripe fruit that drop from being bruised.

AFTER the crop is all gathered, let the trees receive the showers that may fall by pulling down the fashes; shut them close in the evening, and make a little fire, if the weather is cold and dark, till the trees have finished their growth.

WHEN the leaves are decaying, go over them lightly with a besom at different times, in order to bring off such of them

as

as part easily from the wood, that the sun and air may more freely get to the shoots ; as air, heat, and moisture, prepare and ripen them for the following season. If the wood is not ripened before it is exposed to the inclemency of the weather, there will be but a poor crop the succeeding year : although there may be a good deal of blossom, the parts of fructification will be so weak, as to die away in general without producing fruit. If the bottom of the border is of a cold clayey nature, the trees will be a considerable time longer in ripening their wood, than if it was sand or gravel. However, it must be observed not to force them into flower in the autumn. I have known blossoms and some fruit about the size of a filbert-nut appear early in September, by keeping up too much heat to ripen the shoots :
when

when this is the case, the trees receive injury, and will not bear a good regular crop the following season.

WHEN the leaves are all or mostly dropt, take off the fashes, and lay them away, that the border and trees may be exposed to the weather.

Now is the proper time to give them their autumn pruning, by cutting out the weakest shoots, and any old naked branches that it is necessary to take away. The same year's wood that was not rubbed off in spring, but was shortened down, on account of being placed immediately at the foot-stalks of the fruit, must now be all cut off. Tie the shoots to the trellis from six to eight inches separate, and at that distance every year after the first of forcing; observing to

F shorten

shorten them when the petals begin to appear.

It frequently happens, that some forced trees push too luxuriantly for the production of fruit. In order to bring such trees to a bearing state, cut out a few of the strongest shoots, when they have finished their growth: at same time, cut several or most of their large roots, about two and a half feet from the stem, if the branches are extended ten or eleven feet; and according to the size of the tree, cut the roots longer or shorter in proportion. Those that are taken off must be removed, and fresh rich earth put in place of that dug out of the trench. This operation will cause the trees to produce abundance of fruitful wood next season.

WHEN

WHEN they have got their autumn dressing, clear the border of leaves and rubbish, laying away the wooden walks.

IF coals are used, the flues of this early forced-house must be cleaned every year, the front one in particular: but if wood is burnt, they will not need sweeping above once in three or four years; however, all flues ought to be cleaned before they appear to have much occasion for it; because the clearer they are of foot, they require the less fire. The present is the most proper season for performing this work.

THE border must now be dug without disturbing the roots: leave it rough and open, that the frosts may have the more effect on the soil.

THE trees that have been managed agreeable to these foregoing directions, will be in good condition for forcing early the second year after they are planted.

WHERE it is required to have ripe fruit by the tenth of May, put on the sashes the first of December, and apply the fire-heat at the same time. If the extent of the forcing-house is ninety feet, and fruit not wanted before the middle of June, the twelfth of January is the proper time to light the fire of one apartment; and in order that the crop of the second may come in for gathering before that of the first is over, apply the fire-heat to it, and put on the glasses the middle of February. When it is intended to have peaches so early
as

as the last week of April, apply the fire the fifteenth of November.

IN the last case, about eight or ten days before the fruit comes in for gathering, begin to give a great deal of air, for about four or five hours every day, longer or shorter according to the weather; because peaches and nectarines ripened by the end of April, although of the natural size, and produced from strong healthy trees, will have but little flavour, if air is not admitted largely as advised. If the weather is frosty and cold, the fire ought to be continued through the day; on which account a greater portion of it can be given. This management will greatly heighten the flavour of these fruit.

IN

IN the months of November, December, January and February, the weather is commonly such as to occasion the fires to be kept up, not only in the night, but also through the day: although the sun should shine an hour or two, the fires ought not to be extinguished, but covered with ashes taken from below the grate, and the furnace door set open: by this method the fires can quickly be set a-burning when necessary.

TREES forced so early as the middle of November, in the manner directed, will have strong fruitful wood for the following year, and their fruit will be ripe before the end of April; but they will not in general be so large, nor so well flavoured, as those that come in two or three weeks later: neither is it

to be expected, that the crop will be so regular or plentiful. However, where there is such extensive forcing of peaches and nectarines as at Moredun, the house being two hundred and fifty-six feet in length, producing a succession of fruit upwards of five months, it is not improper to force one apartment so early.

THOSE unacquainted with the forcing of these fruits so soon in the season, are commonly of opinion, that the trees will only continue a few years, if they are forced oftener than every other one. By experience I have reason to conclude, that they will last as long as those in the natural way, and in more vigour and health than what are to be seen on the best aspects of common walls in Scotland, and the northern parts

parts of England, if they are managed in the method laid down.

The following peaches and nectarines are the best kinds, and most esteemed for forcing, arranged in the order in which they ripen.

PEACHES.

Early Purple,
Montauban,
Royal George,
French Mignon,
Red Magdalene,
Nobleſſe,
Rambouillet, and
Nivette.

Nec-

NECTARINES.

Elrouge,
Newington, and
Roman.

Where it is required to have roses or other flowers brought early into bloom, the forcing-house for peaches will be a very suitable place for that purpose. There are no forced plants more liable to be infected with vermine than roses; on which account the most proper situation for them is over the vacuity, between the front-glass and flue; where they will thrive and be free of insects.

While the steaming season continues, there must be no pots with plants set on the flue, only a row may be placed, as mentioned, above the vacuity, the

G

pots

pots standing on the edge of the flue and wall.

IF two or three orange-trees in pots or boxes, not too large, were placed on the border near the front, they would thrive finely, and their sweet-smelling flowers, which they produce from the same year's wood, would make the forcing-house very agreeable. When their fruit are about the size of pease, the smallest ought to be cut off, and only one or two at most left on a shoot. By keeping the heads of the trees thin of branches, and planting them in a composition of equal quantities of rich light loam and earth produced from leaves, they will bear good fruit; but not near the size they would grow to, if one apartment of the house was appropriated to their cultivation, by
planting

planting them in the border, against the back wall, and training them to the trellis: in such a situation they will flourish amazingly, and the fruit swell very large. It is almost unnecessary to observe, that peach-trees cannot be properly managed in the same house with orange-trees planted in this manner. Among many differences in their culture, the orange-trees, besides being covered with the sashes in winter, require so much fire at that season, in cold weather, as to keep the mercury between 45° and 55° .

LIKEWISE, if cherry-trees in pots were placed in the early forced apartment in the first week of December, they would be in full blow soon in January; but they will not bear fruit at that time of

the year; although the flowers will be very beautiful. When cherries are wanted from the trees in pots, they ought not to be forced before the first week of February; and even at that season the crop is very uncertain. The trees for this purpose should be well established in the pots, by being at least a twelvemonth planted in them.

WHEN the steaming season is over, if two rows of strawberry-pots are set along the front-flue, they will succeed well: if they were placed there sooner, the strong steam would destroy the parts of fructification; but if set on the border, it will do the flowers no injury.

THE scarlet, or Virginian and Alpine strawberries, are the sorts proper for forcing.

forcing. The first is most esteemed for flavour, but the crop is soon over; the other produces a great deal of fruit, but is much more liable to be infected with vermine than the Virginian.

CHAP.

C H A P. III.

On keeping Peach and Nectarine Trees free of all Insects they are liable to suffer by.

TO return to the time that the fire-heat is applied, begin to use water in the following manner.—When the weather is such as occasions pretty brisk fires to be kept up, with the watering-pan and rose on it, sprinkle a few panfuls of water over the front-flue when it is well warmed, which a little fire will do, and the house is shut up. Repeat this five or six times together, it will raise a thick steam, and wet the
trees

trees in every branch, greatly promoting the rising of the sap. Let this be done in the evening five or six times in the week, and frequently through the day, when air cannot be admitted, and the flues are so warm as to raise the steam.

WHEN little or no fire is necessary but at night, water the trees all over with the engine in the afternoon. Soft or rain-water is most proper for the purpose: in frosty weather it ought to be six or eight hours in a large tub or cistern within the house, before it is used in this manner.

WHEN the trees are in blossom, if it is so cold as to make it requisite to keep up the fires through the day, fill the house with steam in the way directed,
and

and raise it so thick, that a man cannot see the length of himself: this likewise promotes the setting of the fruit. When it is done three times in the twenty-four hours, the first should be as soon as the flue is warmed in the morning; the second, about two or three in the afternoon; and the third immediately after the heat of the house and flues is examined, and the fires regulated for the night.

WHEN the trees are in blossom, and not steamed in the way advised, give them a gentle watering with the engine in the evening, two or three times a-week: this should be like a fine light shower, that none of the delicate parts of fructification may be hurt.

SOON after the leaves begin to appear,
 2 the

the *aphis* or small green fly attacks them; and some time after, a worse enemy to them, called the *acarus*, or *red spider*. To prevent the breeding of these vermine, continue the steaming work, and increase the waterings with the engine to five or six times in the week. Trees infected with the green fly may be totally cleared of them by the same process: but it is not just so efficacious in destroying the red spiders; although it entirely prevents their multiplying. It is much better to hinder the growth of insects, than to depend upon killing them when they appear; as all infected trees receive a check in a greater or less degree.

I cannot assert that this method will in like manner prevent the mildew: but have often observed, that in the

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early

early forced apartments, where the steaming was longest continued, the trees have never suffered more by it, than a few leaves in some seasons. In the late divisions, sometimes they are more affected by it; but in no greater degree than the extreme parts of a few shoots, which are always cut off as soon as observed.

NOTWITHSTANDING the great encomiums bestowed upon tobacco-smoke for destroying vermine on peach and nectarine trees, it does not the least injury to the red spider. It kills the *aphis*, when the smoke is strong, and confined some time: requiring to be often repeated to keep them at under; which makes the forcing-house very disagreeable: but it does neither good nor hurt to the trees and flowers: whereas the

series of steaming and watering here recommended, while it preserves the trees from insects, is, at the same time, conducive to their health and vigour; making the art of forcing imitate nature, by softening and meliorating the drying influence of fire-heat.

WHEN the fruit are set in general, and about the size of pease, begin to spread the water over the trees obliquely, and with more force, that they may be well moistened. Perform this twice at the same time; observing in the second watering, to begin at the end you left off at in the first. By this method every leaf and branch will be sufficiently wet. This work may be done any time if the day is dark: in sunshine it is most proper to defer it till the rays fall obliquely on the front of the house, or till they are off it altogether.

H 2

WHEN

WHEN the fruit are beginning to ripen, which is known by their changing colour, the trees should only be watered two or three times a-week. From the time that the crop is come in for gathering, till it is over, or thereabout, give them none, unless the weather is hot and dry : even then, twice a-week will be sufficient.

THE border, for about two feet broad below the trees, will be moist enough by the water which falls from them : the other part of it should be kept in a moderately humid state, till the fruit are about ripe and in gathering, when it ought to be rather dry than otherwise.

FROM the small quantity of water thrown on the trees during this period, and the air of the house being dry, it is probable

probable the red spiders will make their appearance: as soon as they are observed, drive it on that part morning and evening with force; this will prevent their spreading.

WHEN the crop is just about finished, increase the waterings with the engine to four or five times a-week: where the fruit are all off, spread it on the trees without reserve: in wet dark weather once a-week will be as often as necessary. These waterings must be continued till the wood for next year is perfectly ripe.

C H A P.

C H A P IV.

On a Forcing-house with the Flues all in the Back-wall, and the Management of late Peaches and Nectarines.

THE Forcing-house described in Chap. I. is as well adapted for the production of late as early fruit; but where the latter are not required, the following construction of one, without a flue in the front, will answer equally well for the former. The flues should run three times along the back-wall, the bottom of the first being ten inches above the border. This flue must be three feet deep, and the face of it built with

with bricks of the common size, four inches and an half in breadth. Between the first and second flues there ought to be about one foot of solid building. The second should be two and an half feet deep, the bricks for the face of it three inches and three fourths in breadth, and the covering seven inches thick. The third or uppermost must be two feet deep, and the bricks for the face three inches broad. If the flues are built in this manner, one fire is sufficient for forty-five feet in length of the house; which should be six feet wide, and the wood-work of it the same with the one for early forcing: It will not be so suitable for that purpose, as if there had been a flue in front; but every other way will answer equally well. All the difference in the management of the forcing in such a house as this, is, that
the

the trees will require to be oftener watered with the engine while fire is continued, as the steam will not arise so strong from the back as front flue.

IN order to have good fruit very late, put on the sashes when the petals begin to expand ; and when the weather is tolerably moderate, pull them so far down that their lower ends may rest on the walk, observing to shut them close in the evening. Make no fire unless the mercury is so low as 40° ; and even then only so much as to keep it between 36° and 42° through the night.

IN those nights that fire is used, after the flues are a little warmed, give the trees a light watering all over twice a week, during the time they are in flower ; which, in place of hurting the fecundating

dating *farina* of the *antheræ*, as given out by some gardeners, promotes the setting of the fruit. When the trees are out of flower, and the leaves expanding, increase the waterings with the engine to three or four times a-week, more or less according to the weather. As there should be no fire but in sharp frost, this work must not be repeated so often as where a brisk fire-heat is kept up.

WHEN the fruit are about the size of small horse-beans, lay away the sashes, if the season is become moderate: slight frost will do no hurt to the fruit, if they are brought forward in the hardy manner directed.

THIS cannot be called forcing, being only protecting the blossoms in their infant state from the severe frost, which
 I often

often happens during the time peach and nectarine trees are in bloom, and their fruit setting in the natural way.

AFTER the scales are taken off, if the nights are cold, water the trees in the forenoon. When the frosts are gone, do it four or five times a-week, between four and six in the afternoon, if the weather is dry: if it is the reverse, half this watering will serve. In hot sultry days, when it is performed in the evening, it is very beneficial, not only in preventing the breeding of insects, but in promoting the growth of the trees and crop.

THE fruit should be thinned in the manner directed when they are early forced, and the trees dressed by the same rule.

IN

IN the last week of September, sooner or later, according to the season, put on the sashes again, before sharp frosty, or cold wet nights commence. In moderate days, pull them so far down, that their lower ends may rest on the walk: shut them close in the evening, and make a little fire, increasing it as the long cold nights advance.

As the trees are not so liable to be infected with vermine in autumn as in the spring and summer, give them no water in dull soft weather after the middle of September: when it is otherwise, give them a light watering all over in the afternoon, once in four or five days, till the fruit are come in for gathering, when it must be omitted, if the red spiders dont make their appearance till the crop is finished: it should then be

performed twice in the week, and a little fire continued till the wood is ripened, and the leaves near all dropt: at which time it should be given over, and ten or twelve days after, take off the sloping fashes, pruning the trees and digging the border, in the manner directed for the early forcing-house.

SOME may imagine that it is unnecessary to be at so much expence, as late peaches can be got towards the end of September and in October from a good aspect and common wall; but such fruit, although soft, have seldom any flavour: whereas those managed in the foregoing method will be large, well flavoured, and always a good crop.

BUT, unless where the forcing of these fruits is extensive, it is more proper to
have

have them ripe in July and August: in which months they can be got in the greatest perfection.

HOWEVER, where it is intended to have them so late as October, the following sorts are most proper for the purpose, viz.

PEACHES.

Teton de Venus,
Rambouillet or Rambullion, and
Nivette.

NECTARINES.

Newington, and
Roman.

CHAP.

C H A P V.

*On the Construction of Hot-walls, and the
Management of the Trees without Glafs.*

IN the building of uncovered hot-walls, intended for peaches, nectarines, figs, &c. observe the following plan.—A wall ten feet high should have one fire to forty feet in length, which is four hundred square feet. The first course of the flue ought to be three feet deep, and the bottom of it ten inches above the border: the face of it to be built with bricks of the common size, four inches and an half in breadth. Between the first and second flue there must be
seven

seven inches of solid building. The second should be two feet and an half deep, the breadth of the bricks for the face three inches and three-fourths, and the covering five inches thick. The third or uppermost ought to be two feet deep, the bricks three inches broad, with eight inches of solid above it. All these bricks, though of different breadths, should be the same in thickness and length. A hot-wall constructed after this manner, will be regularly warmed by small fires from bottom to top. The trees should be nailed to it, without laths of wood against the lower course of the flue, as advised by some.

THE management of uncovered hot-walls appears to be but little understood as yet in North Britain, the success being bad in most places. On this account
many

many are of opinion that they are improper for this country. In some gardens I have observed peach-trees on such walls in a very sickly condition, some of them past recovery; while at the same time, the said kind of trees, in the same garden, and on the same aspect of a common wall, were thriving. The reason is this, the warmth in the flues greatly promotes the breeding of insects; and trees against hot-walls will always suffer more, and earlier in the season by vermine, than those on common ones. If the method here laid down for preserving trees from insects is followed, the value of flue'd walls will be found, as the success is ascertained from many years experience.

PEACH and nectarine trees, to remain for good, should be planted against these
walls

walls twenty feet separate, in such prepared borders as directed for the forcing-house: and in order to have fruit soon, one in a bearing state may be planted between every two of them. As the young trees advance upon those that are bearing, cut off the branches of the latter from time to time to make room for the former, and at last take them up altogether.

THE most proper season to apply the fires, is when the blossoms begin to open. If there is a little sunshine, and the weather mild, when the trees are in bloom, small fires in the night will serve: when it is the contrary, continue fire through the day; but never more than what is necessary to keep up such a warmth as a common south aspect brick-wall acquires by the sun shining

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full

full on it in the month of April or early in May. When this is the case, give the trees a light watering with the engine, three times in the week, before noon.

WHEN the weather is moist and mild, weak fires only being requisite at night, delay watering till a few of the leaves are expanded; at which time it must be set about, otherwise they will be soon infected with the *aphis*, and the trees receive an early check. This is the first insect that breeds on them, and of itself is often the destruction not only of the crop, but also of the trees. In order to keep free of these vermine, with others that would make their appearance when warm weather commences, drive the water with force over the trees, when the fruit are all set; before that time, it
ought

ought to be thrown very lightly on them. Let this be done three or four times in the week, even if the nights are cold and frosty, as a proper warmth in the wall will prevent the leaves and young fruit from being hurt by such frosts as generally happen in March and April.

TREES nailed to an uncovered hot-wall, are in more danger of being hurt by too much heat, (which error an unexperienced gardener is liable to fall into) than those planted in forcing-houses and trained to a trellis: however, too strong fires must be guarded against in regard to either. In the latter, the thermometers are of service in regulating the warmth; but on the former, they are of no use. The person who has the management of these hot-walls,

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when

when fires are necessary, must often examine their influence; which at no time ought to be so strong, that he cannot lay his hand against that part of the flue nearest the furnace for eight or ten minutes together, without the least uneasiness by the heat.

WHEN the cold nights are gone, the fires should be given over; only in dark weather a little will be necessary.

IN dry sunshine days, the trees must be watered five or six times a-week in the evening, which will keep them perfectly free from vermine.

THE thinning of the fruit and dressing of the trees ought likewise to be performed in the manner directed for the early forced ones.

WHEN

WHEN the crop begins to ripen, omit the watering. If there happen frosty nights, or dark moist weather, while the fruit are gathering, continue a moderate warmth in the wall, which will be of service in heightening their flavour. After they are all off, it will be proper to water the trees twice a-week if the season is dry.

THE fire-heat must not be given over altogether before the trees are done growing, and their leaves near about all dropt; at which time they will be well prepared for next year's crop. They should then have their autumn dressing: thin them if there is too much wood, and nail the best shoots from six to eight inches separate.

THE extent of the hot-wall recommended,

mended, viz. four hundred square feet, is as much as ought to be allotted to one furnace, if the bottom of the border is of a cold clayey nature, and the situation unfavourable: but in warm exposures, where the bottom is sand or gravel, one fire will serve five hundred square feet; if the flues are built in the manner, and with such bricks, as directed. When a wall is twelve feet high, which is sufficient, there should be four flues in the height.

There are but few places in Britain where the following fine late pears come to perfection in the natural way, viz. Cressane, Colemar, and winter Bon Chretien; the last grows to a large size, and is allowed to be an excellent fruit. These three kinds are deserving of a hot-wall; on which they will ripen
early

early in September, by keeping up such a warmth in it as advised for the peaches. The fires should be applied when the blossoms are near expanded.

These trees are seldom infected with vermine; nevertheless, after the fruit are set, water them twice a-week with the engine in dry weather, which will greatly promote their health and vigour. Suffer no more shoots to remain than what appear necessary; and lay those that are wanted to the wall, about eight or nine inches separate.

WHEN figs are planted against a hot-wall, the shoots should be ten or eleven inches apart, their leaves being very large. It is natural for the fig-tree to produce two crops in one season; the first from the last year's wood, and the
second

second from the same summer's shoots: the second never ripens in Britain in the natural way, and in many places the first does not; but in a forcing-house, both crops will come to maturity.

ALL walls intended for peaches, nectarines, figs, and the fine late pears, ought to be flued; otherwise the crops will be very uncertain. Such of these fruits as grow on common walls, in most places, are of little or no value; owing to the long nights, raw frosts, and want of sunshine, which prevent them from acquiring that agreeable taste and flavour they would be possessed of, were they assisted by the foregoing methods.

CERTAIN it is, that a few of the earliest sorts of peaches ripen and are good

On common walls in favourable situations and fine seasons; yet, even in the most suitable places, the crop is precarious; if it is middling one year, most likely there will be next to none for several to come.

C H A P. VI.

On forcing Peaches and Nectarines without Flues in the Back, and keeping those on common Walls free of Insects.

WHERE there is a good brick or stone wall about eleven or twelve feet in height, and furnished with such sorts of peach and nectarine trees as are recommended in Chap. II. a forcing-house may be erected upon it, without disturbing the trees, by conducting the flues in the following manner.—If the fruit are not required before the middle of June, two fires will be sufficient for an hundred feet in length. The furnaces

naces should be placed behind the middle of the back-wall, and the flues must run along the surface of the border in the method explained Chap. I. returning in the same way, the second being close by the side of the first, making a double flue: both the first and second ought to be eleven inches deep; the first eight inches wide, and the other seven. They should be separated by bricks laid in bed, and these on edge will be sufficient for the other side of the returning flue. They must be built on arches supported by small pillars, the tops of the former being no higher than the surface of the border. The two vents for the smoke ought to be in one building behind the middle of the back-wall, between the furnaces.

THE wood-work of the house, which

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should

should not exceed seven feet in breadth, must be the same with that of the one described for early fruit; only there will be no occasion for a trellis, as there are no flues in the back-wall.

THE two apartments may be forced alternately; for which purpose, sashes will only be needed for one half of the length, that must fit both divisions.

THE trees to be managed thus.—In the first week of January, put the glasses on one apartment, and light the fire at the same time. The degree of heat and admission of air, to avoid repetition, ought to be the same as laid down in Chap. II.

WHEN the weather is such, that brisk fires are necessary, raise a thick steam
in

in the house twice or thrice in the twenty-four hours, and let it be the last work that is done in the night: but the trees must not be watered with the engine any day it is performed, as they are not so liable to be infected with the red spider when there are no flues in the back-wall. When this steaming work cannot be executed, water as directed for the other houses.

THE crop will be over early in August, and soon after the wood for next year will be ripened; at which time the fashes must be taken off and placed on the other division. If the weather is dark, apply the fire-heat, but raise no steam when the fruit are ripe and in gathering.

THE fire must not be given over till
the

the trees have finished their growth, and the leaves are most all dropt; which, as has been mentioned, ought to be assisted by sweeping off such as part easily from the wood.

THE trees in the apartment that were forced the preceding year, will naturally come sooner into flower than if they had not been so managed; and by their wood being properly ripened, their blossoms will be strong, and not so liable to suffer by bad weather as those produced from unforced trees: however, if it happens to be severe while they are in bloom, they can easily be protected by stretching bafs-mats along the rafters.

PEACH and nectarine-trees on common walls, in most places, suffer by the

aphis immediately after the leaves appear; and at that season there are often sharp frosts in the night; on account of which the trees cannot be so freely moistened as to prevent the breeding of insects: when this is the case, water them with the engine early in the forenoon; if in sunshine, so much the better. This must not be done while they are in flower: but when the frosts are gone, perform it three or four times a-week in the afternoon with force.

LAY only a few more shoots to the wall than what appear necessary for the following year: such as are produced at the fruit, should remain till they have got six or seven leaves; they ought then to be stopt by taking off a little of their tops: when the trees are pruned in autumn, these must be all cut off.

IF

If the shoots of peach-trees on common walls were kept so thin as to be about eight or nine inches separate, the bricks would acquire a greater heat by the sun; and the wood and fruit would have better chance to ripen, than where there is so much of the former laid to the wall in the summer dressing as only to be three or four inches apart.

C H A P.

C H A P. VII.

On raising and forcing Vines.

ALTHOUGH several sorts of grapes ripen in the southern parts of England without artificial warmth, these delicate fruits never attain perfection in the natural way in Scotland. Even flued walls are not sufficient to insure a good crop of well-flavoured grapes, unless they are defended with glasses; because slight frost injures a vine when the sap is in motion in spring, and bad weather commences in autumn before the fruit can be brought to maturity. The success then being so uncertain, the only re-

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source

source that can be applied to, is to cultivate them in suitable forcing-houses, or against covered hot-walls, where they will produce their clusters in perfection and abundance.—Shall first give some directions for early grapes, and then treat of their management when it is intended to have a main crop later in the season.

OF all fruit-bearing trees there are none that strike root more freely by cuttings than the vine; which is at once the most proper and convenient method of propagating this plant. The wood for these cuttings should be hard with the pith small, having the buds large, round, and near one another. The usual practice is to allow them several joints in length, with a little of the old wood at their lower extremities; but this is
of

of no consequence, it being found from experience, that as strong and fruitful vines are produced from cuttings planted in the way hereafter explained, as from those which have several buds, and are furnished with a bit of the old wood: so that from a well-ripened shoot there may be raised eight or ten plants, if not more, according to the number of good round eyes on it. The proper time to take off the shoots for this purpose, is when the leaves are become yellow, the wood being perfectly ripe and done growing. They must not be cut into single buds till the spring, but laid in a vinery where no fire is kept, or any other dry place, with their lower ends three or four inches in the earth. Here they should be occasionally covered in severe or wet weather with dry

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litter ;

litter ; which ought always to be removed when it is moderate.

THE beginning of February, make preparations for a hot-bed for the cuttings in the following manner.—Procure equal quantities of fresh horse-dung and new tan, according to the number of plants intended to be raised. If there is the conveniency of a large open shade to mix the ingredients in a heap, they will be in better case for the hot-bed ; which should be made up about three weeks after the materials are thrown together : build it three feet and a half high, and two feet and an half broader and longer than the frame intended to be placed upon it ; then lay about eight inches of tan all over the top, to within ten inches of the sides and ends ; completing these

these spaces with turf the same height, which will prevent the bark from tumbling down. Put on the frame and glassess, covering the dung around it with straw or litter about six inches thick, and lay boards above all, which will preserve the bed from being injured by treading, and continue the heat longer in it. In order to bring the warmth soon to the surface, the glassess should be kept close, with a good quantity of mats over them for eight or ten days: after which time, the bed will be in proper condition for receiving the cuttings. When it is so, get the shoots that were laid in the earth the autumn before, and cut off eight or ten of the lower buds, never using the one next the old wood, as it is always very weak. Leave about a quarter of an inch of the shoot on both sides of the eye,

eye, and fill pots, four inches and an half within top, with light rich compost moderately moist, to within an inch of the brim. Press the mould gently down, and place the cutting on it in an horizontal position with the bud uppermost; about which the earth should be firmed a little, except immediately above the eye, it being covered half an inch. When they are all planted, plunge the pots in the tan their full depth. A frame ten feet by six within side will hold about one hundred and forty, placed two inches separate.

As there will be no danger of the bed thus prepared becoming too hot for vine-cuttings planted as directed, when the pots are all plunged, cover them and the tan between with clean moist moss about an inch in thickness; but observe

serve to leave a small space above the bud. This will preserve a fine moist heat, which is most conducive and natural to vegetation, in the surface of the bed.

ADMIT air every day into the frame, less or more according to the weather; and when the sun shines, shade the glasses with mats, till the vines have advanced about an inch above the earth they are planted in; when they should enjoy as much light as possible, and have a great deal of air in the day time when the season is mild. As long as it is severe, the glasses must be constantly matted over at night.

WHEN the plants are advanced about ten inches in height, take them out of their small pots with their balls entire;
place

place them in others two inches wider, and fill the space around the ball with the same kind of earth that the cuttings were planted in; taking care, that after a little mould is put in the bottom of the pot, the ball may be placed so deep in it, that it can be covered about half an inch. Which done, set a straight stick to each about two and an half feet in length, and tie the vines to them; then give them a moderate watering with the rose on the pan to settle the earth.

RAISE the frame about a foot and an half in the following manner.—Place a strong stake in the bed at each corner of the frame, and fix it well upon the top of them, nailing boards closely round the opening made by raising it. Stir the bark within down to the mixed

dung and tan, plunging the pots to the brim as before, about two inches separate; then cover the whole surface with moss, and put on the glasses. In fine weather, raise the ends of the sashes at the back of the frame seven or eight inches, increasing or diminishing this portion of air according to the season; and if at any time, upon removing the moss, the earth in the pots is found to be dry, the plants should have a moderate watering.

As the frame will not contain the same number of vines, after they are shifted, what remains, when it is filled up, can be disposed of in some other proper place. If there is the convenience of a pine-apple stove, it will be a good situation for them; and they will

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thrive

thrive better if there is room to plunge them in the tan.

It must be observed, that when the young vines push out side shoots, they should be pinched off a little above their first leaf. By this method, the buds that are to produce wood and fruit next season, will grow in general much stronger, than when the lateral shoots are rubbed off close to the main one from time to time. It will greatly impede the progress of the plants if they are suffered to trail along the bed; therefore, as they advance in height, let them be neatly tied up to their sticks with soft bafs.

THE following are the most proper kinds for early forcing.

WHITE Muscadine; a great bearer
and

and good grape. The berries are round, and hang loose on the bunches.

WHITE Sweet-water; a good grape. The berries are large and round when in perfection; but it commonly happens that there are some of them remarkably small on the same bunch.

BLACK Cluster; a good grape, and bears well: the bunches are short, and the berries oval, which fit very close to each other.

GREEK, or Brick-coloured grape; a good bearer: the berries are small and well tasted.

THE plan of the forcing-house recommended for early peaches is equally suitable for the production of early grapes;

only the small bars of the trellis must be placed, horizontally, six inches separate; the lower one being seven inches from the back-wall, and the others coming gradually nearer it, so as the uppermost may be no more than two inches from the bricks. These horizontal bars ought to be nailed to upright ones, fixed six feet separate.

THE border should be made of rich loam, lighter than what is advised for peaches, fifteen inches deep, and the whole breadth of the house. If the bottom is of a cold clayey nature, cover it eight or ten inches thick with stones or hard rubbish, to prevent the roots going deeper than the prepared foil.

IN the last week of July or first in August, before the young vines raised
in

in pots the same year have finished their growth, plant them eight inches from the back-wall, one foot four inches separate, with their balls of mould entire, placing these so deep, that they may be covered an inch or little more : which done, tie the shoots to the trellis in a perpendicular direction, and give the earth a good watering to settle it to the roots. The fire-heat should then be applied and continued every night and dark day, till the vines have perfectly ripened their wood. Due attention must likewise be paid to admit a proper portion of air every day, less or more according to the weather. As vines require more heat than peach-trees, the mercury should be kept about 65° with fire, and 72° with sun-heat.

WHEN the shoots are perfectly ripe,
and

and the leaves dead, cut down the first plant to the second bud, the second to the fourth, the third to the second, and so on to the end ; observing to displace the remainder of the lateral shoots that were stopt at the first leaf. At same time the fire must be given over : and two weeks after take off the fashes, laying away the wooden walks.

IN the last week of February put on the glasses again, and apply fire-heat. From the shoots that were cut at the fourth bud allow two to be produced ; one from the fourth, and the other from the second eye. On those cut at the second joint, there should only one shoot be left. The eye which is next the old wood is always so very weak that it ought never to be depended upon.

IF the shoots are not perfectly ripe when the grapes are all gathered, the forcing must be continued, as vines require more heat and longer time to bring their fruit and wood to maturity than other trees.

By the second autumn after planting, this wall will be well furnished with good shoots; and the vines being placed so near one another, a succession of fruitful wood can easily be continued, by pruning them in the following manner. Those that have two shoots, should have the one produced from the uppermost bud cut about nine feet above the border, and the other from the same plant about three feet. Those that have only one, ought to be left about five feet in length.

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THE third season begin to force the first week of January, regulating the young growth as follows: Train a shoot from the uppermost bud of all the last year's wood, and one likewise from the second eye of the plant that has but one shoot: each of these must be allowed to run to the top of the wall before they are stopt. Those that are produced from the other buds should be shortened at the first joint above the cluster, provided they have fruit; but if they have not, remove them by taking them off at the first leaf. This is a much better method than to pull them away altogether from the old wood: for when they are so displaced, the hole is apt to bleed, which weakens the vine; but in this manner, there will be no danger of its receiving any injury from that cause. The remainder of these shoots must be
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cut off close in the autumn dressing: in which, being the third, each of those vines that were shortened at the fourth bud in the first year, should now be cut down to the shoot produced from the second eye, and all the others pruned, so as they may bear a regular and plentiful crop, still having it in view to insure a good supply of young wood. It is supposed to be unnecessary to give any farther directions for autumn pruning, than that every year after the third, there must be more or fewer of the plants cut down to within a few inches of the ground, in order to continue the wall properly furnished in every part with fruitful shoots.

THE fourth season the vines will be in good condition for early forcing; so when grapes are required by the middle

of May, the fashes ought to be put on, and the fire-heat applied about the twenty-fifth of November. As they are very quick growers, they must be dressed at least twice a-week after they begin to push, otherwise they will soon run into confusion. All weak straggling shoots, produced from the old branches, should be rubbed off as soon as they appear. The lateral ones that grow on the same year's wood ought to be shortened at the first leaf, and always taken off at the same place as they push anew. This method must be practised upon that part of the shoot which is to be left; but those that are situated on what is to be cut away in the autumn may be rubbed off close. The shoots intended for next year ought to be allowed to run to within a few inches of the top of the wall before they are stopt: all
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others that have fruit must be shortened at the first joint above the cluster ; and if they have none, they should be cut off at the first leaf as before advised.

SOON after the grapes are formed, the kinds that fit close on the bunches ought to be thinned with very narrow-pointed scissars: in performing which, the greatest part of the stalks of the berries that are cut off must be left. In this manner there will be no danger of the remaining fruit receiving injury by the operation.

As these directions for the summer dressing of vines are the same in both the early and late houses, it will be superfluous to repeat them. From the time that the forcing is begun till the plants begin to push, if the weather is so moderate that little fire serves, water

the shoots all over with the engine five or six times a-week in the afternoon: but when the season is such that strong fires are requisite, raise a thick steam as often in the evening, by sprinkling a few panfuls of water over the front-flue after the house is shut close. From the time that the vines are begun to grow, the steaming ought to be continued, when brisk fires are used, at least twice or thrice a-week, till the fruit begin to ripen; at which time it must be omitted. When the crop is all cut, water every other day, if any of the leaves are infected with the red spider; but if they are not, this work will be unnecessary. The *acarus* is the only insect that vines are hurt by; for when it attacks the leaves while the shoots are growing, the former are soon killed; and the consequence is, the fruit have no
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flavour, and the wood does not ripen. It is a great mean to keep free of these destructive vermine, to have the air of the apartment a little moist when the season is dry, or much fire-heat is necessary. Exposing the vines fully to the weather in their inactive state, and giving plenty of fresh air while they are forcing, is also productive of the same effect. However, extremes must be guarded against; in particular, the house should be as dry as possible when the grapes begin to ripen and are gathering; otherwise they will be in great danger of rotting. To prevent which, if the weather is moist, continue fire through the day as well as in the night, admitting a large portion of air. This management will not only preserve the fruit from spoiling, but much increase their flavour.

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FROM the time that the heat is applied, till the young shoots begin to appear, give only a little air; afterwards it ought to be admitted more freely, but with caution, during the time the vines are in flower.

THE border should be kept moderately moist, especially after the fruit are set: only when they are ripening, the watering of it must be omitted.

As soon as the wood is perfectly ripe, the sloping sashes should be taken away, and the shoots pruned and tied according to the directions already laid down: which done, carry out the walks, and cover the border two or three inches thick with very rotten hot-bed dung, working it into the earth with a fork, disturbing the roots as little as possible.

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This dressing ought to be repeated every other year after the third, and should likewise be practised on the borders in which peach-trees are planted.

SUCH is the method to be followed in order to have grapes ripe very early.— Shall now proceed to the management of vineries planted with the superior sorts, that are not proper for forcing so soon in the season.

A Vinery fifty feet in length, twelve in height, and the same in breadth, requires two fire-places, which should be built behind the back-wall, one at each end, under shades, otherwise they will not draw regular in windy weather. These furnaces must be two feet long, the same in height, and sixteen inches wide; which will be room enough
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for fuel in the coldest season: the frame of metal on which their doors are hung ought to be a foot square. Each should warm two courses of a flue; one being in the front of the house, three feet distant from the wall, and the other in the back. For the construction of the former see the directions in Chap. VI. The latter to be conducted as follows. Let the lower run be nine inches broad, fifteen inches deep, the bottom of it six inches above the border, and the sides the breadth of a brick in thickness, leaving a vacuity of two inches between it and the back-wall, that the more heat may arise. The uppermost course must be eight inches wide, one foot deep, and built with bricks set on edge, the face of it being even with that of the lower one. Between the first and second there ought to be about six inches of

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solid. The bars of the furnace which warms the front flue should be sunk three feet beneath the level of the bottom of it, in order that it may draw properly. It is not necessary to have the other fire-place so low, as the rise of the flue from it is effected with less than the half of the distance which the front one requires. A vinery of the foregoing dimensions, with the flues and furnaces thus constructed, can be kept warm enough, even in a severe season, by moderate fires; and there will be no occasion to renew them at midnight, as advanced by some.

THE front and end walls must be nine inches thick, and the back one eighteen. The former to be built on arches whose tops are an inch or two beneath the surface of the earth, in or-

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der that the roots of the vines within side may have liberty to run at full length; and for the conveniency of bringing those without into the house, there ought to be holes left in it, two or three inches above the intended height of the border, and three feet separate.

IN this vinery there will be no occasion for upright glafs, except in the ends. The flogging fashes to be in two equal lengths, all the lower row being moveable, and every other upper one furnished with ropes and pulleys, as the top is the most proper place for admitting air. When the season is very hot, it will also be necessary to pull down the lower glaffes. Sometimes it is not proper to open the roof-fashes; therefore it will be a good method to have a small window at each end, above the back flue,

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two feet long and a foot broad, for the purpose of giving a little air in cold weather.

THE trellis should have the same slope with the rafters; the horizontal bars, across the under sides of which the vines are to be trained, being ten inches separate, and a foot at least from the glass.

BOTH the borders without and within the house must be the same height, composed of such soil as is recommended for the early forced vines; and if the bottom is cold and wet, cover it likewise eight or ten inches thick with stones or hard rubbish, raising the new earth as much above the level of the adjacent ground. Make the outside border nine feet broad, and the one within the whole breadth of the house,

laying that part of it between the front flue and back-wall two inches thick with sand or gravel ; and if the outside border is gravelled in the same manner, it will look better, and be more agreeable to walk upon.

THE vinery thus constructed, the following grapes are the proper kinds for planting it with.

ROYAL Muscadine, or White Chassalafs ; a very rich grape and great bearer : the berries are round, and sit close to one another, with the bunches of a good size, which ought not to be cut till they become of an amber colour.

BLACK Frontiniac is a rich grape ; the berries are round, and rather loose on the cluster. It is a better bearer, and
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the bunches shorter than the other Frontiniacs.

WHITE Frontiniac; a rich fruit, but not a great bearer; the berries are round, and fit close to one another.

RED, or Grizzled Frontiniac, being the same; the berries are round, and hang loose on the bunch. It is a very rich grape, but a bad bearer.

BLACK Hamburg is a good fruit; the clusters are pretty large, and the berries a little oval, hanging loose.

IN planting the vine-stove with these kinds, there ought to be two of the Royal Muscadine to one of the other sorts.

WITH regard to the White Syrian,

it is a very elegant fruit, the clusters and berries being uncommonly large; but they have little or no flavour, therefore it is not worth culture.

THE middle of October is the proper time for planting. If the vines are raised the same year in the method formerly laid down, they will at this season be strong and well ripened: therefore, in the outside border, opposite the holes left in the front-wall, plant a vine to each, turning it out of the pot with the ball of earth entire; which must be placed so as it may touch the bricks, and be covered an inch or little more with mould. At the same time, draw the shoot through the wall, and fill up the aperture round it closely with dry moss. The inside of the house should then be furnished with the same number of vines
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in a row, fifteen inches from the front ; every one being exactly in the middle between two of those without ; so shall the plants stand one foot six inches separate. When this work is completed, give the earth a moderate watering to settle it about the balls.

THE most, if not all, of these young vines would produce some fruit the following season, but it will be far better not to let them bear so soon, as they will have much stronger wood. To effect which, cut all those that are drawn through the holes at the second bud within the wall, and those inside down to the third eye.

THE sashes must not be laid away in winter, as in the early house ; but every moderate day at that time admit a great deal

deal of air, to prevent the shoots growing mouldy.

THE first year after planting, apply the fire-heat about the middle of March, keeping the vinery a little moist, attending to the precautions already mentioned for that particular. Only allow one shoot to be produced from each vine, training them the whole breadth of the roof, as most of them will grow to that stretch.

IN November the wood will be ripe and fit for pruning; which must be performed as follows.—Cut the first plant about ten or eleven feet in length, the second at the third bud, the third about five feet long, the fourth at the third bud again, and the fifth at ten or eleven feet;

feet, observing the same order to the end.

THE third season light the fires the twenty-fifth of February, which always after will be the proper time to begin the forcing in a grape stove of this plan. As soon as the buds begin to break, regulate the young wood thus—In order that the vines which were left ten feet in length for supplying the upper part of the roof as soon as possible, may push strong, rub off all the eyes on them except the two highest. From those shortened at the third joint, train one shoot, allowing it to run to the top; and from those cut at five feet encourage the second and extreme eye in like manner. The fruit will be produced this season principally from the two shortest plants, as the long ones were divested of their

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buds

buds to strengthen the wood on them. When these shoots for next year are fixed upon, the others must be treated in the method formerly explained for the summer dressing, with regard to stopping them when they have clusters, or removing them altogether: and this is the more necessary, as all superfluous wood must be displaced, that the rays of the sun may not be too much excluded from the grapes.

AT the third autumn pruning, the vines that were left ten feet in length that time twelvemonth, will now have two shoots at their extremities; each of which should be cut at their sixth or seventh bud. Those that were five feet long at that season will now likewise have two shoots; one from the second eye, and the other from the highest: both of these

these ought to be cut at five feet again. Those that were then only allowed three joints, have now one shoot, which must be left about three feet in length.

IN the fourth pruning, cut down to within a few inches of the ground the plants that were shortened at ten feet in the second autumn dressing: this will make room for the others that are advancing upwards, and furnish young wood at the bottom. By cutting down entirely every year so many of the vines that have borne fruit to the top of the house, and observing the foregoing rules, there will be no danger of the under part of the roof becoming naked; as one plant is bearing at the bottom, a second at the middle, and the third at the extremity, each vine supplying one or other of these places in rotation. When

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their old branches are cut, they produce a great number of shoots ; therefore leave only one of the strongest on each of these that are annually so treated near the ground. This management will encourage the one that remains to push freely. In the beginning of the season, as the young wood of vines is liable to be displaced from the last or former year's, even by a gentle touch, it must be very tenderly handled, and carefully secured at that time.

SOON after the forcing is commenced, there must be long litter or the like laid against the stems that are without the house, to prevent the vines receiving injury from the frost ; which, if slight, will not hurt them ; but in March, and often in April, is severe enough to destroy them, if such an accident was not guarded

guarded against in the above manner. At that period it will likewise be necessary to cover the whole breadth of the outside border with the same materials, which must remain no longer there than the weather is severe.

THE inside one must be frequently watered, in particular after the fruit are set, till the time that the black sorts of grapes begin to change from a green to their ripe colour ; then it should be omitted, and the house kept quite dry till the crop is all gathered. In great droughts in summer, it will also be very beneficial to the vines if the outside border is occasionally watered.

DUE attention must be paid through the whole season to admit a proper portion of fresh air, regulating this article according

according to the state of the weather, and the heights of the thermometer mentioned for the early forced-house. About the time that the fruit are ripening, when the sashes cannot be shut up with a brisk sun-heat, apply moderate fires; this will be of service to the flavour of the grapes.

DURING the winter, the inside border ought to have several gentle waterings to keep it a little moist, that the roots of the vines may not shrivel and dry.

WHEN vines are trained into a pineapple stove, the two following sorts are most proper for the purpose, being very late in ripening.

THE Tokay, or White Muscat of Alexandria, which is the same. It is a
firm

firm fleshy grape; the berries are large and oval, hanging loose on the bunch. This possesses the richest flavour of all the large kinds I am acquainted with. It is equal to the White Frontiniac, but not a great bearer.

BROWN Hamburg. The bunches and berries are large; the latter are a little oval, and fit closer on the cluster than the Tokay: it is a better bearer, but inferior in quality, though a pretty good fruit.

THE sorts that hang loose are most proper for the Pinery, not being so liable to rot: but if any of the close growing grapes are cultivated in stoves with tan-pits, they ought to be thinned soon after the berries are formed.

ABOUT the end of June or early in July, fix upon some vigorous growing shoots, and shorten them : but no nearer that part of them which is turning brown than six or seven buds. This will cause them to push out strong lateral shoots, showing clusters that will ripen in winter.



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